

AMENDMENTS TO THE SPECIFICATION:

Please replace the paragraph on page 17, lines 9-19 with the following amended paragraph:

-- FIGS. 3a and 3b illustrate a tubular photobioreactor, which utilizes sunlight upon exterior cultivation. The sunlight 3 is directly irradiated to an outer surface of a second culture region 1 which produces a useful metabolite and is placed at a portion of the photobioreactor to which the sunlight 3 is irradiated. A first culture region 2 to execute the vegetative cell growth is closely layered on a lower side surface of the first culture region 1. The sunlight is transmitted through the second culture region 1 to the first culture region 2 contacted with ground 4. --

Please replace the bridging paragraph on pages 35-36 with the following amended paragraph:

-- In this test, a double-layered upright-cylindrical air-lift photobioreactor, as shown in FIGS. 13a and 13d, was used. Gas was injected to the photobioreactor through its lower and upper parts. The photobioreactor, as an embodiment of the photobioreactor of the present invention, is a double-layered upright-cylinder type with an external irradiation. In the same manner as in the photobioreactor of FIGS. 12a and 12b, the photobioreactor used in this test had an internal region composed of an upright-cylindrical outer jacket corresponding to the second culture region 1 to produce a useful metabolite and an inner core corresponding to the first culture region 2 to execute the vegetative cell growth. The light energy was supplied by linear fluorescent lamps 8 installed in the exterior of the upright cylinder. Gas supply apparatus 5 was installed at a lower part of the cylinder in order to inject gas 7 into the second culture region 1 and circulate the biomass in the culture medium by a difference in the density of the gas supply. Unlike the photobioreactor of FIGS. 12a and 12b with the gas injection unit 6 installed at its lower part, the photobioreactor used in this test was constructed to generate gas at a lower part of the inner core through an upright stainless tube installed at an upper part of the cylinder. --